



*OECD Nuclear Energy Agency  
International Workshop on*

## **Structural Materials for Innovative Nuclear Systems**

**31 March – 3 April 2025, Madrid, Spain**

***Hosted by CIEMAT***

**First announcement**

The OECD Nuclear Energy Agency (NEA) and CIEMAT are co-organising the Seventh International Workshop on Structural Materials for Innovative Nuclear Systems (SMINS-7). The workshop will be held in Madrid (Spain) from 31 March to 3 April 2025, hosted by CIEMAT, and with the support of the Joint Programme on Nuclear Materials of the European Energy Research Alliance (EERA-JPNM), as well as of the CONNECT-NM Co-funded European Partnership on Nuclear Materials.

### **Background**

Materials research is a field of growing relevance for advanced nuclear systems, such as Generation IV reactors, Small Modular Reactors, Advanced Modular Reactors and Micro Reactors, transmutation systems and fusion devices. For these different systems, structural materials must be selected or developed to address the specific challenges of their foreseen operational environments. This requires both cross-cutting research programmes and advanced experimental/simulation facilities to characterise and evaluate the performance of materials.

The purpose of this workshop is to stimulate an exchange of information on current materials research programmes for different innovative nuclear systems, with a view to identifying and developing potential synergies.

### **Scope**

The workshop will cover **fundamental studies, modelling and experiments** connected with the discovery, design, development, manufacturing and joining, qualification and behaviour in operation of innovative structural materials, including cladding materials, for **advanced nuclear systems** such as thermal, fast and sub-critical reactors, as well as fusion systems.

### **Fundamental studies, materials design, materials processing and joining, evolution of material properties:**

- Identification of mechanisms driving the response of materials under the conditions expected in innovative nuclear systems. These mechanisms may be described at the atomic or at higher scale, following multiscale approaches. Problems of scale bridging are of special interest along with advanced simulation techniques and data driven modelling/learning.
- Ion and neutron irradiation, as well as corrosion and high temperature exposure experiments, and subsequent characterization of materials microstructure, degradation modes, time-dependent properties, mechanical properties, thermal properties, radiation tolerance, environmental resistance.
- Novel and advanced methods (including numerical approaches) for the production and optimisation of materials and components: for instance, high-performance coating, additive manufacturing, laser sintering, and innovative joining techniques for similar and dissimilar materials.

### **Metallic alloys, ceramic and ceramic composites, advanced/novel materials for nuclear applications:**

- In- and out-of-core applications and relevant materials characterisation, both microstructural and mechanical; data availability and gaps; experimental and modelling needs for specific components; advanced manufacturing techniques; qualification path in connection with their use in advanced systems; link between R&D, standardisation and experimental protocols; discussions on design code development and implementation plans.
- Advanced/novel materials can be: steels and other metallic alloys with superior properties for use in innovative nuclear systems; complex concentrated alloys; functionally gradient materials; nano-grained materials; grain boundary engineered materials; nano-precipitation-strengthened materials and micro-laminates; prospective materials.

*Please note that fuel-cladding interactions and zirconium alloys for fuel cladding will not be covered in this edition of the workshop. Other novel materials for accident tolerant fuel cladding in LWR systems are within the scope of the meeting.*

### **Programme**

Plenary lectures and technical sessions will be organised according to the topics listed above.

A workshop discussion session on “materials challenges for advanced and small modular reactors: from the need for innovation to licensing” will be organized.

A poster session covering all technical subjects will be held.

## Important dates (registration and abstract submission)

Participants willing to give a presentation should submit an abstract by **31 October 2024**. A template can be found in [Instruction for authors](#).



Abstract template  
for SMINS-7.docx

When uploading your abstract we also ask that you agree to grant rights for the OECD/NEA to publish the abstract in a summary report on SMINS-7.



Copyright grant of  
rights-SMINS7.docx

Participants planning to attend the meeting are invited to complete the [Registration form](#) before **31 January 2025** (NB: you will need to login into your NEA account or pre-register if you do not already have an NEA account).

31 October 2024	Close of abstract submissions
15 December 2024	Notification to authors
31 January 2025	Close of registrations

## Fees

No registration fee will be charged. If, following your registration, you decide not to attend, please send a cancellation note to the NEA Secretariat (email: [ian.hill@oecd-nea.org](mailto:ian.hill@oecd-nea.org)).

## Working language

The working language will be English.

## Book of abstracts and proceedings

All abstracts will be included in a book of abstracts and published by the NEA after the meeting. Authors will be asked to authorize the publication of their accepted abstract upon submission.

The presentations will be shared via the NEA website and act as meeting proceedings.

## Venue, hotel, transport

The workshop will be held at the CSIC Headquarter premises in Madrid, Spain. Information on lodging and local transport will be communicated in due time.

## Workshop officials and committees

### *Scientific and Organising Committee*

Fanny Balbaud (CEA, Chair of the Expert Group on Structural Materials)

Céline Cabet (CEA, Co-chair of the Expert Group on Structural Materials)  
Lorenzo Malerba (CIEMAT, Co-chair of the Expert Group on Structural Materials)  
and EGSM members

***Local Organising Committee***

Mareike Kiwitt (CIEMAT)  
Maria Luisa Fernández Vanoni (EERA)  
Lorenzo Malerba (CIEMAT)  
Marta Serrano (CIEMAT)

All correspondence with regard to the meeting should be addressed to the workshop Secretariat:

**Ian HILL**  
OECD Nuclear Energy Agency  
46 Quai A. Le Gallo  
92100 Boulogne Billancourt  
France  
Email: [ian.hill@oecd-nea.org](mailto:ian.hill@oecd-nea.org)